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Results of ESEA/Title I programs designed to prepare educationally disadvantaged children for school in eight New York state school districts are contained in the 3-year report on a total population of 1,805 children. Standardized intelligence and readiness tests given at the beginning and end of prekindergarten were used to determine the effectiveness of the programs. It was found that such programs were beneficial for disadvantaged but not for nondisadvantaged participants, that certain programs stressing language development were most beneficial, that program effectiveness increased over the 3 years, that boys and girls benefitted equally, that disadvantaged white children benefitted more than did disadvantaged nonwhite children, and that no significant interaction occurred between sex and race. A study of standardized test scores after the kindergarten year showed a continuance of these effects. Further studies are planned involving testing at the end of grade 1. References and tables of results are included. (MD)

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PREKINDERGARTEN PROGRAMS
FOR THE DISADVANTAGED

A Third-Year Report
on an Evaluative Study

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RE 001 832

December 1968

In 1965, prekindergarten programs for the disadvantaged were launched with considerable fanfare and the conviction on the part of many that an educational effort with young children would go a long way to solving the academic and ultimately the economic problems of the deprived. Now, at the end of three years, questions are being asked about just what has been accomplished and where we should go from here. The answers to these questions should come from objective evaluations that relate the outcomes of prekindergarten to the goals of the program and that are of sufficient duration to make possible valid generalizations and inferences. The New York State Study of Prekindergarten Programs for Educationally Disadvantaged Children is such an evaluation. Initiated in 1965, the study covers three years of experience with prekindergarten programs and includes follow-up of the participants into kindergarten and first grade.

This third-year report is in fact an interim report, for follow-up evaluation is to continue this year with the testing of children at the end of kindergarten, first, and second grades. However, the findings at the end of three years have provocative implications.

The Programs and the Participants

Like Head Start classes and the prekindergarten activities supported under Title I of the Elementary and Secondary Education Act, the programs under study have had as their objective the preparation of culturally deprived children so that they will be better able to succeed in school and will thus be able to escape and not perpetuate the cycle of early

academic failure, school dropout, and lack of social and economic opportunities. The specific goals of the programs are:

1. Increased capacity to learn
2. Greater language development
3. Better self-concept
4. Increased motor development
5. More positive attitudes toward school

Participating in the study are eight New York State school districts.¹ Each district has been free to develop its own program to meet the stated goals, although activities to promote language and cognitive development--factors which differentiate the disadvantaged and the nondisadvantaged--have been encouraged. The basic curriculum in all eight districts follows the traditional nursery school pattern. Some distinctive additions have been made. In Schenectady, children in one school receive individual instruction using reading readiness materials, pre-primers, and primers as they are able. In Cortland, which entered the project in its second year, the children are divided for part of their school day into Language-Pattern groups where Bereiter-Englemann techniques are employed and discussion groups where directed conversation is used for language building. In Mt. Vernon, the children spend a brief part of the day at a teaching machine programmed for language instruction.

In general, the programs have operated on a half-day basis with two and one-half hour sessions. Each class of 15 pupils has had one trained teacher and a teacher aide.

The project population for the three years totals 1,805; it includes 307 nondisadvantaged subjects concentrated in two districts that desig-

¹Cortland, Greenburgh, Hempstead, Long Beach, Mt. Vernon, Schenectady, Spring Valley, Yonkers.

nated the mingling of children from different backgrounds as part of their program treatments.

Disadvantagement was determined by the father's occupational rating (category 5, 6, or 7) on the Warner scale. When the father was absent from the home, mother's occupation or general economic status was the criterion used. All subjects had to be eligible by age for kindergarten in the following school year and free from emotional or physical handicaps.

After screening by the district and preliminary testing with the Stanford-Binet and the Peabody Picture Vocabulary Test, the children were randomly assigned to experimental and control groups. The experimentals attended the prekindergarten classes; the controls remained at home during the school year before kindergarten.

Evaluation

The project evaluation has focused on the first two goals of the prekindergarten program: Increased capacity to learn and language development. The immediate effects of prekindergarten were measured by administration of the Stanford-Binet, the PPVT, and the Illinois Test of Psycholinguistic Abilities at the end of the prekindergarten year. For a longitudinal assessment, Metropolitan Readiness Tests were given at the end of kindergarten and Metropolitan Achievement Tests at the end of first grade.

Group means were the bases for the analyses of the test results by treatment, socioeconomic status, district, race, and sex. For the pretest-posttest measures--the Stanford-Binet and the PPVT--changes in mean scores were compared. Covariance analysis was necessary for the comparison of

means on the ITPA and the Metropolitan Tests. The Stanford-Binet and the PPVT pretests were used as covariates. The data for each wave of subjects were treated separately.

The analyses of pre-post test results provide answers to questions on the initial effectiveness of the prekindergarten programs. The analyses of the results on the follow-up tests of readiness and achievement given in kindergarten and first grade offer bases for inferences about the sustaining power of any benefits derived from prekindergarten. Tables summarizing the results are given in the Appendix and will be referred to by number as each conclusion is presented.

In drawing conclusions, attention has been given to the cumulative incidence of significant differences between specified groups as well as to the project years in which the differences occurred. In determining the initial value of prekindergarten, the three test measures (SB, PPVT, and ITPA) have been treated equally and the number of significant differences has been noted across tests. Thus, in comparing any two groups--experimental-controls, whites-nonwhites, males-females--there is the possibility of nine significant differences at the end of prekindergarten: 3 measures for 3 waves = 9 comparisons. When the data are examined by districts and within programs, there are 75 possible significant differences over the three years.²

Findings

The following are the findings with regard to the initial effectiveness

² Wave I	7 districts X 3 measures	= 21 comparisons;
Wave II	8 districts with 2 programs in one district = 9 programs X 3 measures	= 27 comparisons;
Wave III	Same as Wave II	= 27 comparisons;
		<u>75</u>

of the prekindergarten programs:

1. The prekindergarten experience was beneficial for the disadvantaged as indicated by significant differences between disadvantaged experimental and control children on the Stanford-Binet, the PPVT, and the ITPA.

Over the three years, there were nine out of nine possible significant differences favoring the experimental disadvantaged children (Tables 1, 2, and 3).

2. The prekindergarten experience was of no benefit to the nondisadvantaged participants.

In the three years, there were only two out of nine possible significant differences between the nondisadvantaged experimental and control groups, and one of these favored the controls (Tables 1, 2, and 3).

It should be noted that the nondisadvantaged children were located in only two districts and that the generalizability of the finding is thus limited.

3. Not all the prekindergarten programs were effective for disadvantaged children; some programs benefited disadvantaged children by increasing capacity to learn and language development while others did not.

The effectiveness of prekindergarten for the total disadvantaged population reported in finding 1 was not the consequence of effectiveness in every district but resulted rather from averaging the outcomes of successful

and unsuccessful programs. Over the three years, there were 26 out of 75 possible significant differences in favor of the disadvantaged experimentals in the eight districts. Twenty-one or 81% of these occurred in four districts (Tables 4, 5, and 6).

4. The effectiveness of the programs increased over the three years of operation as indicated by increasing proportions of significant differences in favor of the experimental disadvantaged groups within districts.

At the end of the first year, there were 4 out of 21 possible significant differences (19%) in favor of the experimentals; in the second year, there were 10 out of 27 (37%) and, in the third year, 12 out of 27 (44%). The increasing effectiveness of the programs may be attributed to experience which was sufficient to offset the regression effects of "Hawthorne withdrawal" (Tables 4, 5, and 6).

5. The programs produced significant differences in favor of the experimentals on the three tests with relatively the same frequency.

For the three waves of disadvantaged subjects in the eight districts, there were 10 significant differences in favor of the experimentals on the Stanford-Binet, 8 on the PPVT, and 8 on the ITPA (Tables 4, 5, and 6).

6. The prekindergarten experience was equally effective for boys and girls.

Direct comparison of disadvantaged experimental boys and disadvantaged experimental girls on nine null hypotheses showed only three significant differences, one in favor of the girls and two in favor of the boys. When compared with their control counterparts, the experimental boys were significantly different six out of nine times; the experimental girls were significantly different from their controls eight out of nine times (Tables 7, 8, and 9).

7. The prekindergarten experience was beneficial for both white and nonwhite disadvantaged children; however, it was more effective for the white children.

Both experimental whites and nonwhites in the disadvantaged group were significantly different from their control counterparts on six out of nine comparisons. Within the experimental groups, the disadvantaged white children had gain scores significantly higher than the nonwhite children on five out of nine comparisons. In no case did the nonwhite experimentals have significantly higher scores than the whites (Tables 10, 11, and 12).

8. Finally, there were no significant interactions between sex and race (Tables 13, 14, and 15).

In the analysis of the results at the end of prekindergarten, the differential effect of individual programs is of special interest. The question arises, "What was the nature of those programs that produced significant differences in the experimental children?" It has been noted

that Schenectady and Cortland, two of the districts with more effective programs, had distinct curricula with reading readiness a formal part of one program and language pattern drills and special discussion groups in the other. The programs in both districts may be categorized as "structured" or "cognitively oriented." This description might be extended to the Yonkers program. Observers in Yonkers reported a heavy language emphasis with exercises in comparison, noting similarities and differences, finding common elements, and using complete sentences. From this it is concluded that the most effective programs for disadvantaged prekindergarten children are those with the most specific and structured activities.

The findings from the follow-up evaluation are fewer in number but of no less importance, for the question of what happens to prekindergarten attenders when they enter school is of critical importance.

The analyses of the Metropolitan Readiness Tests* administered to experimental and control children at the end of kindergarten produced these findings:

1. The differences resulting from the prekindergarten experience were maintained for the disadvantaged group as a whole (Table 16).
2. The nondisadvantaged experimentals and controls showed no significant differences at the end of kindergarten (Table 16).
3. Disadvantaged experimental girls were significantly different from disadvantaged experimental boys and from disadvantaged control girls on reading readiness (Table 17).

The favorable outcome for the disadvantaged experimental group must be attributed to the performance of the girls. Since, as has been

*Tables 16, 17, 18, 19, and 20.

reported, the posttests did not show the prekindergarten experience more effective for girls than for boys, it must be inferred that the girls benefited in some way not measured by those tests, but significant for later reading readiness.

The encouraging results of the kindergarten follow-up are not reinforced by the first grade achievement results available to date. This follow-up testing was limited to Schenectady, the only district in the first year with significant differences on all three measures at the end of prekindergarten. In Schenectady, at the end of first grade, there was no significant difference between the experimentals and controls.

Summary and Comment

To summarize, this study has shown that prekindergarten programs, particularly those that are cognitively oriented and structured for specific goals, do benefit disadvantaged children. Whether the effects endure beyond kindergarten is yet to be established.

These findings are consistent with the results being reported elsewhere. The last year has seen a veritable flood of material on prekindergarten in the professional journals and the popular press. While much of this merely describes Head Start Projects and follow-through activities or gives personal points of view on what should be good for disadvantaged children, there are a few controlled studies with hard data. These research studies do report some degree of success for the preschool experience. More important than the statistically significant findings, however, is the nature of the programs and their objectives. As in the New York State study, the successful programs--

those of Bereiter, Gray, Hodges, Karnes, Nimmicht, and Weikart (1, 2, 3, 4, 5, 6)--are academic-cognitive programs, structured for specific goals.

This consensus across studies should not be ignored. Unfortunately, there is altogether too much evidence that prekindergarten programming is being dictated by traditional views--cherished beliefs about what is good and wholesome for young children--rather than by what accomplishes objectives. For example, none of the Experimental Prekindergarten Programs supported by the New York State Education Department outside of this study is making use of pattern drills, teaching machines, or Montessori methods.

The ultimate success of prekindergarten programs for the disadvantaged will be the elimination of the need for such programs. The goal is to make them extinct, and the sooner we use and build on programs that do make a difference, the sooner we shall be able to abandon educational crutches for special groups and direct our efforts and financial resources to the educational improvement of all students.

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APPENDIX

Analyses of Test Results

TABLE 1

Stanford-Binet I.Q. Changes of Prekindergarten Children
by Socioeconomic Status and Treatment

Score	Wave I 1965-66				Wave II 1966-67				Wave III 1967-68			
	Disadvantaged		Non-Dis.		Disadvantaged		Non-Dis.		Disadvantaged		Non-Dis.	
	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.
	N=245	N=217	N=53	N=54	N=322	N=215	N=82	N=46	N=283	N=216	N=44	N=28
Pretest $\bar{X}$	90.97	90.75	105.98	106.69	92.66	90.97	104.27	105.70	91.43	92.08	105.84	103.11
Posttest $\bar{X}$	90.07	88.20	105.19	105.91	96.71	90.01	109.28	106.59	94.81	90.02	107.02	99.82
Change	-0.90	-2.55*	-0.79	-0.78	4.05*	-0.96	5.01*	0.89	3.38*	-2.06*	1.18	-3.29
Difference	1.65**		0.01		5.01*		4.12**		5.44**		4.47	

TABLE 2

PPVT Raw Score Changes of Prekindergarten Children
by Socioeconomic Status and Treatment

Score	Wave I 1965-66				Wave II 1966-67				Wave III 1967-68			
	Disadvantaged		Non-Dis.		Disadvantaged		Non-Dis.		Disadvantaged		Non-Dis.	
	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.
	N=249	N=214	N=52	N=55	N=320	N=213	N=81	N=46	N=283	N=216	N=44	N=28
Pretest $\bar{X}$	30.50	30.01	43.31	42.15	32.43	31.42	44.21	45.54	27.44	28.88	41.09	36.11
Posttest $\bar{X}$	43.76	41.37	52.77	52.33	43.78	41.35	53.21	54.65	44.85	42.65	53.89	52.71
Change	13.26*	11.36*	9.46*	10.18*	11.35*	9.93*	9.00*	9.11*	17.41*	13.77*	12.80*	16.60*
Difference	1.90*		0.72		1.42**		0.11		3.64*		3.80**	

TABLE 3

Comparison of Adjusted Means on the Illinois Test of Psycholinguistic Abilities
of Prekindergarten Children by Socioeconomic Status and Treatment

[Test administered at end of prekindergarten; covariate: S-B pretest]

Score	Wave I 1965-66				Wave II 1966-67				Wave III 1967-68			
	Disadvantaged		Non-Dis.		Disadvantaged		Non-Dis.		Disadvantaged		Non-Dis.	
	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.
	N=243	N=216	N=53	N=51	N=317	N=212	N=80	N=46	N=281	N=215	N=44	N=28
Adjusted $\bar{X}$	57.08	51.88	69.18	67.05	61.54	57.53	70.77	70.18	64.10	60.96	72.69	72.09
Difference	5.20*		2.13		4.01*		0.59		3.14*		0.60	

* Significant at .05 level

** Significant at .1 level

TABLE 4

Comparison Within Districts of Changes in Mean I.Q. of
Disadvantaged Experimental and Control Children

[Districts grouped by class composition: Heterogeneous--disadvantaged and
nondisadvantaged children; homogeneous--all children disadvantaged]

Wave	Score	Heterogeneous						Homogeneous												
		Greenburgh		Hempstead		Long Beach		Mt. Vernon		Schenectady		Sp. Valley		Yonkers		Cortland ¹		Cortland ²		
		Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	
I 1965-66		N= 30	N= 29	N= 36	N= 29	N= 24	N= 28	N= 49	N= 37	N= 41	N= 53	N= 32	N= 21	N= 44	N= 33					
	Pretest $\bar{X}$	90.40	95.07	89.67	92.76	93.67	94.71	91.35	88.51	90.34	88.81	90.47	86.76	93.64	92.15					
	Posttest $\bar{X}$	86.00	94.66	88.64	88.90	93.46	92.71	89.47	86.73	91.80	85.77	86.91	83.71	95.70	90.21					
	Change	* -4.40	-0.41	-1.03	-3.86	-0.21	-2.00	-1.88	-1.78	1.46	-3.04	*	** -3.56	-3.05	2.06	-1.94				
	Diff.	3.99		2.83		1.79		0.10		4.50*		0.51		4.00						
II 1966-67		N= 33	N= 16	N= 55	N= 23	N= 28	N= 29	N= 48	N= 23	N= 41	N= 38	N= 27	N= 24	N= 48	N= 43	N= 19	N= 19	N= 23	N= 19	
	Pretest $\bar{X}$	96.79	97.63	91.80	87.22	87.29	86.59	95.54	93.22	93.83	92.92	90.56	91.04	92.50	90.16	87.26	91.74	94.48	91.74	
	Posttest $\bar{X}$	99.15	96.44	93.33	87.22	86.86	86.52	97.17	91.96	98.34	89.05	96.52	89.54	99.08	90.86	97.95	91.53	103.61	91.53	
	Change	2.36	-1.19	1.53	0.00	-0.43	-0.07	1.63	-1.26	* 4.51	* -3.87	* 5.96	-1.50	6.58	*	0.70	10.69	-0.21	*	-0.21
	Diff.	3.55		1.53		0.36		2.89		8.38*		7.46*		5.88*		10.90*		9.34*		
III 1967-68		N= 24	N= 18	N= 45	N= 25	N= 27	N= 21	N= 25	N= 26	N= 36	N= 37	N= 29	N= 24	N= 44	N= 41	N= 27	N= 24	N= 26	N= 24	
	Pretest $\bar{X}$	94.45	94.67	90.27	94.44	87.44	88.14	94.64	92.77	91.69	92.05	92.14	93.92	90.11	89.41	91.41	93.13	92.81	93.13	
	Posttest $\bar{X}$	95.29	92.11	93.58	90.20	86.37	85.57	97.76	87.92	95.86	92.70	93.62	94.63	95.70	87.34	100.04	90.25	95.31	90.25	
	Change	0.84	-2.56	** 3.31	** -4.24	-1.07	-2.57	3.12	-4.85	** 4.17	0.65	1.48	0.71	5.59	*	-2.07	8.63	-2.88	2.50	-2.88
	Diff.	3.40		7.55*		1.50		7.97*		3.52		0.77		7.66*		11.51*		5.38		

*Significant at .05 level

**Significant at .1 level

¹Discussion
²Pattern Drill

TABLE 5

Comparison Within Districts of PPVT Raw Score Changes
of Disadvantaged Experimental and Control Children

[Districts grouped by class composition: Heterogeneous--disadvantaged and
non-disadvantaged children; homogeneous--all children disadvantaged]

Wave	Score	Heterogeneous						Homogeneous											
		Greenburgh		Hempstead		Long Beach		Mt. Vernon		Schenectady		Sp. Valley		Yonkers		Cortland ¹		Cortland ²	
		Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.
I 1965-66		N= 30	N= 28	N= 37	N= 29	N= 26	N= 28	N= 48	N= 37	N= 41	N= 52	N= 34	N= 21	N= 44	N= 32				
	Pretest $\bar{X}$	30.83	33.39	29.95	30.28	31.46	32.21	27.40	25.16	33.46	32.04	30.44	30.43	31.39	30.25				
	Posttest $\bar{X}$	40.57	45.07	42.16	42.93	43.54	40.93	41.71	37.30	48.61	41.88	44.12	42.14	45.91	42.66				
	Change	9.7*	11.68*	12.21*	12.65*	12.08*	8.72*	14.31*	12.14*	15.15*	9.84*	13.68*	11.71*	14.52*	12.41*				
	Diff.	1.94		0.44		3.36		2.17		5.31*		1.97		2.11					
II 1966-67		N= 33	N= 16	N= 55	N= 23	N= 28	N= 27	N= 47	N= 23	N= 41	N= 38	N= 27	N= 24	N= 48	N= 43	N= 19	N= 19	N= 22	N= 19
	Pretest $\bar{X}$	34.06	39.38	33.31	31.26	26.43	25.33	34.79	33.74	32.15	33.66	34.00	31.75	28.46	27.79	34.16	34.11	36.18	34.11
	Posttest $\bar{X}$	45.12	47.63	43.71	38.30	38.36	36.37	44.89	44.57	42.78	44.26	45.04	38.58	43.21	40.39	43.53	42.79	48.23	42.79
	Change	11.06*	8.25*	10.40*	7.04*	11.93*	11.04*	10.10*	10.83*	10.63*	10.60*	11.04*	6.83*	14.75*	12.60*	9.37*	8.68*	12.05*	8.68*
	Diff.	2.81		3.36**		0.89		0.73		0.03		4.21**		2.15		0.69		3.37	
III 1967-68		N=24	N= 18	N= 45	N= 25	N= 27	N= 21	N= 25	N= 26	N= 36	N= 37	N= 29	N= 24	N= 44	N= 41	N= 27	N= 24	N= 26	N= 24
	Pretest $\bar{X}$	33.25	27.44	24.67	28.96	19.59	20.43	31.40	30.38	26.42	33.76	33.38	36.33	24.70	21.12	28.89	33.96	29.12	33.96
	Posttest $\bar{X}$	46.96	46.16	42.84	40.32	35.77	32.00	47.16	47.46	45.08	47.19	51.62	50.58	40.91	35.05	49.07	44.63	48.00	44.63
	Change	13.71*	18.72*	18.17*	11.36*	16.18*	11.57*	15.76*	17.08*	18.66*	13.43*	18.24*	14.25*	16.21*	13.93*	20.18*	10.67*	18.88*	10.67*
	Diff.	5.01**		6.81*		4.61**		1.32		5.23*		3.99		2.28		9.51*		8.21*	

*Significant at .05 level

**Significant at .1 level

¹Discussion

²Pattern Drill

TABLE 6

Comparison Within Districts of Adjusted Means
on the Illinois Test of Psycholinguistic Abilities
for Disadvantaged Experimental and Control Children

[Districts grouped by class composition: Heterogeneous--disadvantaged and
nondisadvantaged children; homogeneous--all children disadvantaged.]

[Test administered at end of prekindergarten; covariate: S-B pretest]

W a v e	Score	Heterogeneous						Homogeneous											
		Greenburgh		Hempstead		Long Beach		Mt. Vernon		Schenectady		Sp. Valley		Yonkers		Cortland 1		Cortland 2	
		Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.
99-596	N	30	28	36	28	22	24	45	35	40	52	31	18	39	31				
1961-62	Adjusted Mean	54.79	54.80	55.09	50.96	59.19	54.09	52.66	47.17	61.03	52.45	57.28	52.05	60.01	52.59				
1961-62	Difference		0.01		4.13		5.10		5.49		8.58*		5.23		7.42*				
1966-67	N	32	16	54	22	27	28	47	23	41	38	27	23	47	43	19	19	23	19
1966-67	Adjusted Mean	57.86	57.82	62.64	56.28	56.46	56.18	59.19	57.49	59.19	58.17	63.75	56.89	63.87	56.74	68.54	63.45	67.86	63.45
1966-67	Difference		0.04		6.36*		0.28		1.70		1.02		6.86*		7.13*		5.09		4.41
1967-68	N	24	18	45	25	26	21	25	26	36	36	29	24	43	41	27	24	26	24
1967-68	Adjusted Mean	63.12	63.33	62.51	59.75	58.87	60.33	58.68	59.28	64.50	66.35	66.41	64.59	64.68	55.90	71.26	59.78	66.61	59.78
1967-68	Difference		0.21		2.76		1.46		0.60		1.85		1.82		8.78*		11.48*		6.83*

*Significant at .05 level

**Significant at .1 level

¹Discussion
²Pattern Drill

TABLE 7

Stanford-Binet I.Q. Changes of Disadvantaged
Prekindergarten Children by Treatment and Sex

Score	Wave I 1965-66				Wave II 1966-67				Wave III 1967-68			
	Experimental		Control		Experimental		Control		Experimental		Control	
	1	2	3	4	1	2	3	4	1	2	3	4
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	N=123	N=122	N=109	N=108	N=158	N=164	N=109	N=106	N=152	N=131	N=113	N=103
Pretest $\bar{X}$	90.10	91.85	88.92	92.74	91.85	93.43	90.52	91.43	89.54	93.63	91.49	92.73
Posttest $\bar{X}$	90.34	89.86	86.61	90.11	94.73	98.60	89.18	90.86	93.34	96.50	89.50	90.59
Change	0.24	-1.99*	-2.31*	-2.63*	2.88*	5.17*	-1.34	-0.57	3.80*	2.87*	-1.99**	-2.14*
Difference	2.33		0.32		2.29**		0.77		0.93		0.15	
Diff. 1-3	2.55**				4.22*				5.79*			
Diff. 2-4	0.64				5.74*				5.01*			

TABLE 8

PPVT Raw Score Changes of Disadvantaged
Prekindergarten Children by Treatment and Sex

Score	Wave I 1965-66				Wave II 1966-67				Wave III 1967-68			
	Experimental		Control		Experimental		Control		Experimental		Control	
	1	2	3	4	1	2	3	4	1	2	3	4
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	N=125	N=124	N=109	N=105	N=156	N=164	N=109	N=104	N=152	N=131	N=113	N=103
Pretest $\bar{X}$	30.42	30.51	20.10	31.06	32.94	31.95	32.04	30.78	27.76	27.06	30.19	27.45
Posttest $\bar{X}$	45.13	42.42	42.44	40.35	44.12	43.46	42.39	40.27	46.16	43.33	44.59	40.52
Change	14.71*	11.91*	13.34*	9.29*	11.18*	11.51*	10.35*	9.49*	18.40*	16.27*	14.40*	13.07*
Difference	2.80*		4.05*		0.33		0.86		2.13*		1.33	
Diff. 1-3	1.37				0.83				4.00*			
Diff. 2-4	2.62*				2.02**				3.20*			

* Significant at .05 level
** Significant at .1 level

TABLE 9

Comparison of Adjusted Means on the Illinois Test of Psycholinguistic Abilities of Disadvantaged Prekindergarten Children by Treatment and Sex

[Test administered at end of prekindergarten; covariate: S-B pretest]

Score	Wave I 1965-66				Wave II 1966-67				Wave III 1967-68			
	Experimental		Control		Experimental		Control		Experimental		Control	
	1	2	3	4	1	2	3	4	1	2	3	4
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
	N=123	N=120	N=109	N=107	N=156	N=161	N=108	N=104	N=151	N=130	N=113	N=102
Adjusted $\bar{X}$	57.38	56.77	51.04	52.72	61.66	61.43	56.59	58.50	63.96	64.26	61.74	60.09
Difference	0.61		1.68		0.23		1.91		0.30		1.65	
Diff. 1-3	6.34*				5.07				2.22			
Diff. 2-4	4.05*				2.93**				4.17*			

TABLE 10

Stanford-Binet I.Q. Changes of Disadvantaged Prekindergarten Children by Treatment and Race

Score	Wave I 1965-66				Wave II 1966-67				Wave III 1967-68			
	Experimental		Control		Experimental		Control		Experimental		Control	
	1	2	3	4	1	2	3	4	1	2	3	4
	Non-Wh	White	Non-Wh	White	Non-Wh	White	Non-Wh	White	Non-Wh	White	Non-Wh	White
	N=159	N=86	N=121	N=96	N=167	N=155	N=107	N=108	N=132	N=151	N=94	N=122
Pretest $\bar{X}$	88.82	94.95	87.79	94.59	90.54	94.94	87.22	94.69	88.45	94.03	89.46	94.10
Posttest $\bar{X}$	87.41	95.08	85.20	92.28	91.99	101.79	85.45	94.53	90.01	99.00	86.67	92.60
Change	-1.41	0.13	-2.59*	-2.31*	1.45**	6.85*	-1.77**	-0.16	1.56	4.97*	-2.79*	-1.50
Difference	1.54		0.28		5.40*		1.61		3.41*		1.29	
Diff. 1-3	1.18				3.22*				4.35*			
Diff. 2-4	2.44				7.01*				6.47*			

* Significant at .05 level

** Significant at .1 level

TABLE 11

PPVT Raw Score Changes of Disadvantaged Prekindergarten Children by Treatment and Race

Score	Wave I 1965-66				Wave II 1966-67				Wave III 1967-68			
	Experimental		Control		Experimental		Control		Experimental		Control	
	1	2	3	4	1	2	3	4	1	2	3	4
	Non-Wh	White	Non-Wh	White	Non-Wh	White	Non-Wh	White	Non-Wh	White	Non-Wh	White
	N=163	N=86	N=120	N=94	N=166	N=154	N=105	N=108	N=132	N=151	N=94	N=122
Pretest $\bar{X}$	27.58	35.92	27.40	33.46	28.81	36.34	26.71	36.00	23.85	30.58	24.62	32.17
Posttest $\bar{X}$	40.99	49.07	39.00	44.50	40.41	47.41	36.50	46.06	41.24	48.01	39.54	45.05
Change	13.41*	13.15*	11.60*	11.04*	11.60*	11.07*	9.79*	10.06*	17.39*	17.43*	14.92*	12.88*
Difference	0.26		0.56		0.53		0.27		0.04		2.04**	
Diff. 1-3	1.81**				1.81				2.47*			
Diff. 2-4	2.11**				1.01				4.55*			

TABLE 12

Comparison of Adjusted Means on the Illinois Test of Psycholinguistic Abilities of Disadvantaged Prekindergarten Children by Treatment and Race

[Test administered at end of prekindergarten; covariate: S-B pretest]

Score	Wave I 1965-66				Wave II 1966-67				Wave III 1967-68			
	Experimental		Control		Experimental		Control		Experimental		Control	
	1	2	3	4	1	2	3	4	1	2	3	3
	Non-Wh	White	Non-Wh	White	Non-Wh	White	Non-Wh	White	Non-Wh	White	Non-Wh	White
	N=159	N=84	N=121	N=95	N=162	N=155	N=104	N=108	N=131	N=150	N=94	N=121
Adjusted $\bar{X}$	54.34	62.28	51.28	52.62	59.51	63.73	53.26	61.54	60.42	67.29	59.69	61.97
Difference	7.94*		1.34		4.22*		8.28*		6.87*		2.28	
Diff. 1-3	3.06*				6.25*				0.73			
Diff. 2-4	9.66*				2.19				5.32*			

* Significant at .05 level
 ** Significant at .1 level

TABLE 13

Stanford-Binet I.Q. Changes of
Disadvantaged Prekindergarten Children
by Treatment, Race, and Sex

Wave	Score	Experimental				Control			
		1	2	3	4	5	6	7	8
		Non-Wh. Male	White Male	Non-Wh. Female	White Female	Non-Wh. Male	White Male	Non-Wh. Female	White Female
I 1965-66		N=76	N=47	N=83	N=39	N=60	N=49	N=61	N=47
	Pretest $\bar{X}$	87.35	94.53	90.16	95.46	85.13	93.55	90.41	95.63
	Posttest $\bar{X}$	86.58	96.43	88.17	93.46	83.77	90.08	86.61	94.47
	Change	-0.77	1.90	-1.99	-2.00	-1.36	-3.47*	-3.80*	-1.16
	Diff.	2.67		0.01		2.11		2.64	
	Diff. 1-5	0.59							
	Diff. 2-6	5.37*							
II 1966-67		N=77	N=81	N=90	N=74	N=47	N=62	N=60	N=46
	Pretest $\bar{X}$	89.62	93.98	91.32	96.00	85.49	94.34	88.57	95.17
	Posttest $\bar{X}$	90.26	98.99	93.47	104.85	82.57	94.19	87.70	94.98
	Change	0.64	5.01*	2.15*	8.85*	-2.92**	-0.15	-0.87	-0.19
	Diff.	4.37**		6.70*		2.77		0.68	
	Diff. 1-5	3.56**							
	Diff. 2-6	5.16*							
III 1967-68		N=71	N=81	N=61	N=70	N=46	N=67	N=48	N=55
	Pretest $\bar{X}$	87.14	91.64	89.98	96.80	88.65	93.43	90.23	94.91
	Posttest $\bar{X}$	88.96	97.19	91.23	101.10	86.48	91.57	86.85	93.85
	Change	1.82	5.55*	1.25	4.30*	-2.17	-1.86	-3.38*	-1.06
	Diff.	3.73**		3.05		0.31		2.32	
	Diff. 1-5	3.99*							
	Diff. 2-6	7.41*							
	Diff. 3-7	4.63*							
	Diff. 4-8	5.36*							

*Significant at .05 level

**Significant at .1 level

TABLE 14

P.P.V.T. Raw Score Changes of
Disadvantaged Prekindergarten Children
by Treatment, Race, and Sex

Wave	Score	Experimental				Control			
		1	2	3	4	5	6	7	8
		Non-Wh. Male	White Male	Non-Wh. Female	White Female	Non-Wh. Male	White Male	Non-Wh. Female	White Female
I 1965-66		N= 78	N= 47	N= 85	N= 39	N= 60	N= 49	N= 60	N= 45
	Pretest X	26.69	36.60	28.40	35.10	25.93	32.98	28.87	33.98
	Posttest X	41.27	51.53	40.73	46.10	40.33	45.02	37.67	43.93
	Change	14.58*	14.93*	12.33*	11.00*	14.40*	12.04*	8.80*	9.95*
	Diff.	0.35		1.33		2.36		1.15	
	Diff. 1-5	0.18							
	Diff. 2-6	2.89**							
	Diff. 3-7	3.53*							
Diff. 4-8	1.05								
II 1966-67		N= 76	N= 80	N= 90	N= 74	N= 47	N= 62	N= 58	N= 46
	Pretest X	28.70	36.96	28.90	35.66	27.55	35.44	26.03	36.76
	Posttest X	40.91	47.16	39.99	47.68	36.87	46.56	36.21	45.39
	Change	12.21*	10.20*	11.09*	12.02*	9.32*	11.12*	10.18*	8.63*
	Diff.	2.01		0.93		1.80		1.55	
	Diff. 1-5	2.89**							
	Diff. 2-6	0.92							
	Diff. 3-7	0.91							
Diff. 4-8	3.39*								
III 1967-68		N= 71	N= 81	N= 61	N= 70	N= 46	N= 67	N= 48	N= 55
	Pretest X	24.32	30.78	23.30	30.34	26.33	32.85	22.98	31.35
	Posttest X	42.61	49.28	39.66	46.53	41.28	46.87	37.88	42.84
	Change	18.29*	18.50*	16.36*	16.19*	14.95*	14.02*	14.90*	11.49*
	Diff.	0.21		0.17		0.93		3.41*	
	Diff. 1-5	3.34*							
	Diff. 2-6	4.48*							
	Diff. 3-7	1.46							
Diff. 4-8	4.70*								

*Significant at .05 level.

**Significant at .1 level

TABLE 15

Comparison of Adjusted Means
on the Illinois Test of Psycholinguistic Abilities
of Disadvantaged Prekindergarten Children
by Treatment, Race, and Sex

[Test administered at end of prekindergarten; covariate: S-B pretest]

Wave	Score	Experimental				Control			
		1	2	3	4	5	6	7	8
		Non-Wh. Male	White Male	Non-Wh. Female	White Female	Non-Wh. Male	White Male	Non-Wh. Female	White Female
I 1965-66	N	76	47	83	37	60	49	61	46
	Adjusted Mean	55.84	64.20	56.03	64.40	52.60	52.57	53.02	56.69
	Difference	8.36*		8.37*		0.03		3.67	
	Difference 1-5	3.24							
	Difference 2-6	11.63*							
	Difference 3-7	3.01							
	Difference 4-8	7.71*							
II 1966-67	N	75	81	87	74	46	62	58	46
	Adjusted Mean	60.66	62.56	58.51	65.03	51.57	60.17	54.57	63.41
	Difference	1.90		6.52*		8.60*		8.84*	
	Difference 1-5	9.09*							
	Difference 2-6	2.39							
	Difference 3-7	3.94**							
	Difference 4-8	1.62							
III 1967-68	N	70	81	61	69	46	67	48	54
	Adjusted Mean	61.16	66.23	59.55	68.55	60.96	62.26	58.47	61.62
	Difference	5.07*		9.00*		1.30		3.15	
	Difference 1-5	0.20							
	Difference 2-6	3.97*							
	Difference 3-7	1.08							
	Difference 4-8	6.93*							

*Significant at .05 level

**Significant at .1 level

TABLE 16

Metropolitan Readiness Tests at End of Kindergarten
Adjusted Means for Children Grouped by Socioeconomic Status and Treatment

[Covariates: S-B and PPVT pretests]

Score	Wave I 1965-66				Wave II 1966-67			
	Disadvantaged		Non-Disadvantaged		Disadvantaged		Non-Disadvantaged	
	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.
	N=195	N=161	N=34	N=45	N=271	N=183	N=68	N=37
Adjusted Mean	44.14	41.40	60.20	61.18	47.88	44.77	63.07	60.95
Difference	2.74*		0.98		3.11*		2.12	

TABLE 17

Metropolitan Readiness Tests at End of Kindergarten
Adjusted Means for Disadvantaged Children by Treatment and Sex

[Covariates: S-B and PPVT pretests]

Score	Wave I 1965-66				Wave II 1966-67			
	Experimental		Control		Experimental		Control	
	1	2	3	4	1	2	3	4
	Male	Female	Male	Female	Male	Female	Male	Female
	N=101	N=94	N= 80	N=81	N=130	N=141	N=94	N=89
Adjusted Mean	42.67	45.72	40.48	42.30	47.37	48.35	44.54	45.01
Difference	3.05**		1.82		0.98		0.47	
Diff. 1-3	2.19				2.83			
Diff. 2-4	3.42**				3.54			

* Significant at 0.05 level
** Significant at 0.01 level

TABLE 18

Metropolitan Readiness Tests at End of Kindergarten
Comparison Within Districts of Adjusted Means
for Disadvantaged Experimental and Control Children

[Districts grouped by prekindergarten class composition: Heterogeneous--disadvantaged and nondisadvantaged children; homogeneous--all children disadvantaged]

[Covariates: S-B and PPVT pretests]

W a v e	Score	Heterogeneous						Homogeneous											
		Greenburgh		Hempstead		Long Beach		Mt. Vernon		Schenectady		Sp. Valley		Yonkers		Cortland ¹		Cortland ²	
		Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.	Exp.	Con.
		N=30	N=23	N=24	N=22	N=21	N=22	N=34	N=29	N=30	N=28	N=26	N=14	N=30	N=23				
I	Adjusted Mean	42.41	44.06	42.90	34.22	41.78	41.37	51.45	50.35	42.67	35.54	40.62	41.65	44.43	41.76				
	Difference	1.65		8.68*		0.41		1.10		7.13*		1.03		2.67					
II		N=29	N=14	N=48	N=18	N=23	N=26	N=36	N=19	N=34	N=32	N=24	N=21	N=42	N=37	N=17	N=16	N=18	N=16
	Adjusted Mean	39.99	40.73	54.33	55.68	39.81	41.49	57.88	51.68	42.70	38.57	45.25	42.13	43.14	43.80	51.66	51.41	54.30	51.41
	Difference	0.74		1.35		1.68		6.20**		4.13		3.12		0.66		0.25		2.89	

*Significant at .05 level

**Significant at .1 level

¹Discussion
²Pattern Drill

TABLE 19

Metropolitan Readiness Tests
at End of Kindergarten
Adjusted Means for Disadvantaged Children
by Treatment and Race

[Covariates: S-B and PPVT pretests]

Wave	Score	Experimental		Control	
		1	2	3	4
		Non-Wh	White	Non-Wh	White
I 1965-66		N=129	N= 66	N= 99	N= 62
	Adjusted Mean	43.00	46.58	40.34	42.88
	Difference	3.58**		2.54	
	Difference 1-3	2.66			
	Difference 2-4			3.70**	
II 1966-67		N=145	N=126	N= 92	N= 91
	Adjusted Mean	47.55	48.27	44.03	45.51
	Difference	0.72		1.48	
	Difference 1-3	3.52*			
	Difference 2-4			2.76	

*Significant at .05 level

**Significant at .1 level

TABLE 20
Metropolitan Readiness Tests
at End of Kindergarten
Adjusted Means for Disadvantaged Children
by Treatment, Race, and Sex

[Covariates: S-B and PPVT pretests]

Wave	Score	Experimental				Control			
		1	2	3	4	5	6	7	8
		Non-Wh Male	White Male	Non-Wh Female	White Female	Non-Wh Male	White Male	Non-Wh Female	White Female
I 1965-66		N= 63	N= 38	N= 66	N= 28	N= 49	N= 31	N= 50	N= 31
	Adjusted Mean	41.65	44.50	44.41	48.86	40.39	40.36	40.47	45.34
	Difference	2.85		4.45		0.03		4.87**	
	Difference 1-5	1.26							
	Difference 2-6	4.14							
	Difference 3-7	3.94**							
	Difference 4-8	3.52							
II		N= 69	N= 61	N= 76	N= 65	N= 43	N= 51	N= 49	N= 40
	Adjusted Mean	48.96	45.57	46.31	50.77	48.03	46.61	45.78	44.06
	Difference	3.39		4.46*		4.58**		1.72	
	Difference 1-5	6.93*							
	Difference 2-6	1.04							
	Difference 3-7	0.53							
	Difference 4-8	0.11							

*Significant at .05 level

**Significant at .01 level

TABLE 21

Metropolitan Achievement Tests--Primary I Battery
Adjusted Means for Experimental and Control Children
at End of First Grade

WAVE I

[Covariate: S-B pretest]

Score	Schenectady	
	Exp.	Con.
	N=27	N=35
Adjusted Mean	58.18	51.00
Difference	7.18	